



Installation Guide of Load Cell



Notices

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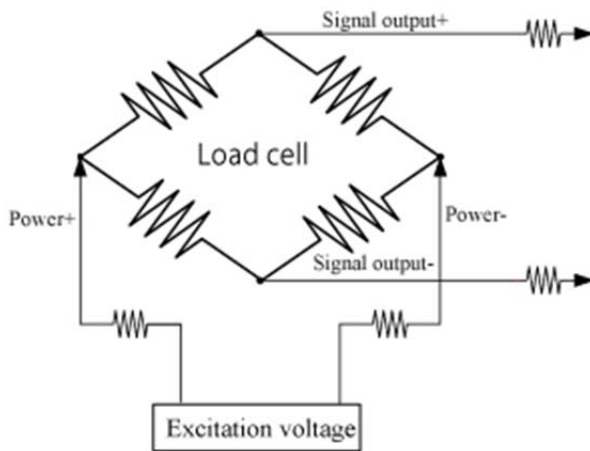
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1 Load Cell Overview

Load cell is used to measure the rod load directly in RPC application. The measurement principle: metal resistance varies due to the strain, proportional to the force applied to it. It is also called strain gauge.

Diagram of excitation voltage added to the load cell bridge (mv output per Excitation V):



Unico currently uses both AW load cell and Flintec load cell.

- PN 325396: 0-15000 lbs AW Load cell with Unico 3 wire 4-20 ma board PN 325085
- PN 325057: 0-30000 lbs AW Load cell with Unico 3 wire 4-20 ma board PN 325056
- PN 325397: 0-45000 lbs AW Load cell with Unico 3 wire 4-20 ma board PN 325086
- PN 325058: 0-60000 lbs AW load cell with Unico 3 wire 4-20 ma board PN 325056
- PN 935935: 0-30000 lbs Flintec load cell with Flintec 2 wire 4-20 ma board.

Notes:

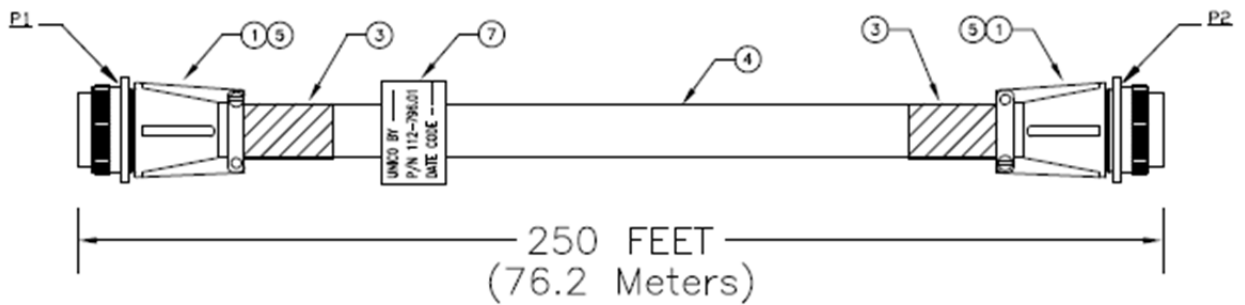
1. AW load cells are only good to use without barrier.
2. AW load cell PN 325057 (30000 lbs) might be only type shipped in the past RPC orders before 2013, which can work with C1D2 barrier with modified curve, up to 26000 lbs.
3. AW Load cell operation temperature is limited by the rev0 3 wire 4-20 ma board, which can operate at 0-70C. It is extended to -40 to 85C with rev1 of 4-20 ma board.
4. **Flintec load cell PN 935935 (30000 lbs) has operation temperature range: -40C to 87C. It is good to use with or without C1D2 barrier, recommended in all new orders of 30000 lbs application.**

2 Load Cell Cable

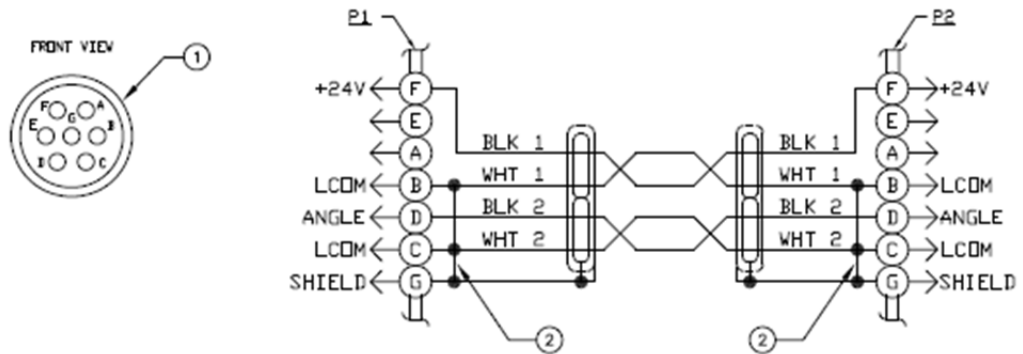
Several load cell cables are available, depends on length requirement. The connection scheme is the same.

Example of PN 112796:

ITEM	PART NO.	QTY.	DESCRIPTION
1	925-004	2	CONN 7/P M CIR SOLDER STR-PLUG 7-#16AWG
2	916-541	4	HDWR JUMPER 0.300 X 0.250 T22
3	914-532	2	HDWR CONN BUSHING .312 CBL MS3420-6
4	929-845	250 FT	COND CABLE 18/AWG 2/PAIR 2/LEAD INDIVIDUAL SHIELDED
5	926-285	4	CONN SEALING PIN FOR 925004 CONNECTOR
6			
7	BIN STOCK	1	LABEL
8			
9			



CONNECTION DIAGRAM



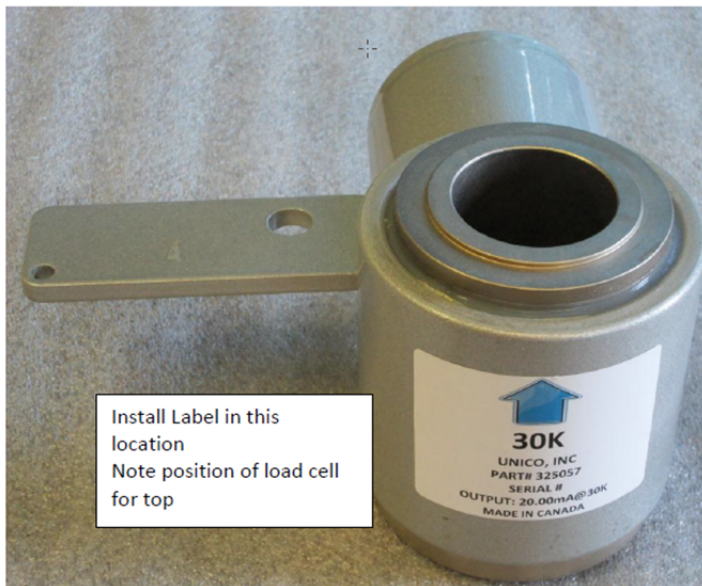
3 Installation of Load Cell and Setup

3.1 AW Load Cell Installation and Setup

3.1.1 AW Load Cell Installation

AW load cells are direction sensitive, direction is labeled as the picture below:

[Unico 30K Pump Jack Load Cell Installation Instructions](#)



Arrow points to the load side.

The following PN# is referred to AW load cells:

- PN 325396: 0-15000 lbs AW Load cell with Unico 3 wire 4-20 ma board PN 325085
- PN 325057: 0-30000 lbs AW Load cell with Unico 3 wire 4-20 ma board PN 325056
- PN 325397: 0-45000 lbs AW Load cell with Unico 3 wire 4-20 ma board PN 325086
- PN 325058: 0-60000 lbs AW load cell with Unico 3 wire 4-20 ma board PN 325056

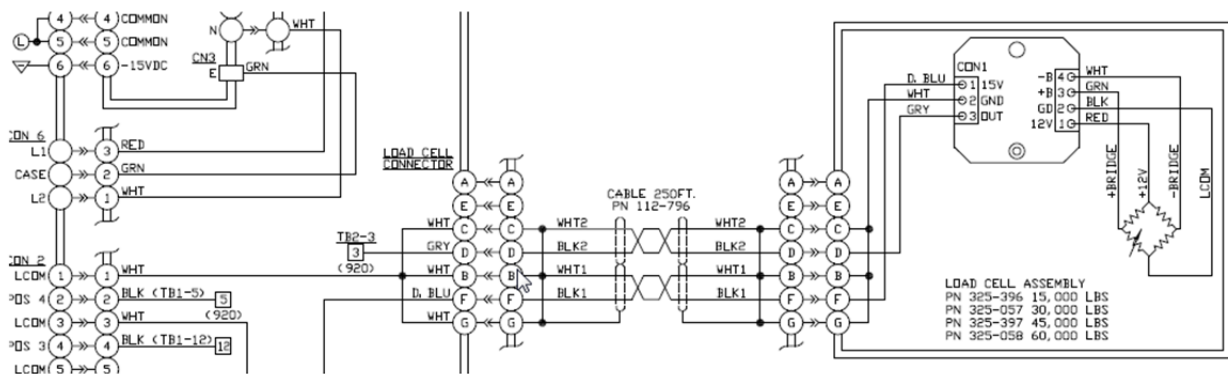
Lock load cell cable to load cell handle:



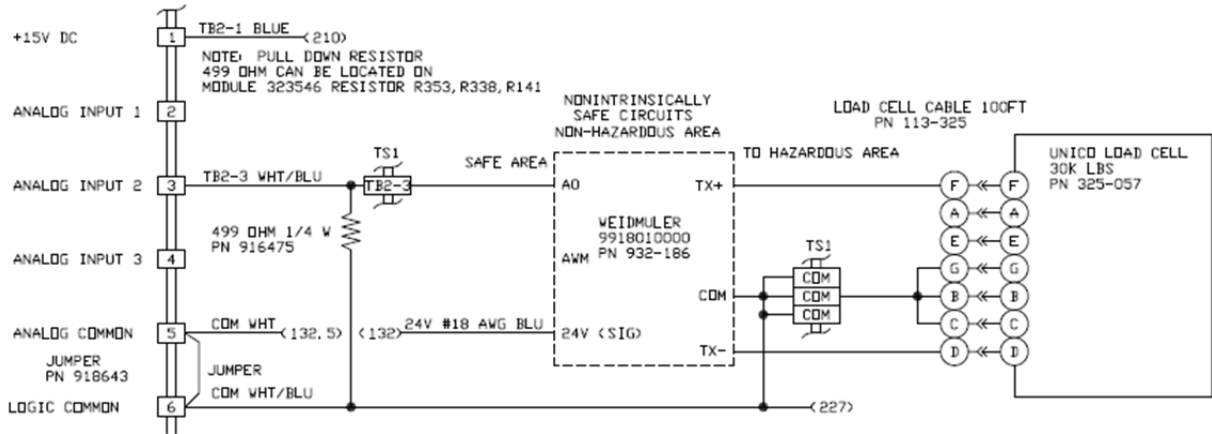
Special washer may be needed. Contact Unico on the detailed info of the washer.

3.1.2 AW Load Cell Wiring

AW Load cell signal is wired directly to DSP board TB2:



AW Load cell signal is wired to DSP board TB2 Thru C1D2 barrier:



Since 325057 is 3 wire 4-20 ma board, the barrier is always in current limiter mode (LED of Weidmuler is always on). A modified load cell curve must be used to overcome the voltage drop across the barrier. Refer to next section of the AW load cell setup with barrier.

3.1.3 AW Load Cell Setup with direct connection

The following items need to setup for using the load cell:

<p>load cell source Choose one of the available inputs. An error message will appear if the Input has already associated with another signal or the Input is not available. Visibility: <i>menu visibility = MAXIMIZE</i> Units: <i>enum</i> Default: ADC1</p>	read/write
<p>load cell min The minimum value for the scaling of the input. Visibility: <i>load cell source is not DISABLED</i> Units: lb/kg Default: 0</p>	read/write
<p>load cell max The maximum value for the scaling of the input. Visibility: <i>load cell source is not DISABLED</i> Units: lb/kg Default: 50000</p>	read/write
<p>load cell min volts The minimum voltage expected at the analog input. Visibility: <i>load cell source is not DISABLED</i> Units: volts Min: -10.000 Max: 10.000 Default: 0.000</p>	read/write
<p>load cell max volts The maximum voltage expected at the analog input. Visibility: <i>load cell source is not DISABLED</i> Units: volts Min: -10.000 Max: 10.000 Default: 0.000</p>	read/write

TB2-2 to TB2-4 are correspondent to ADC 1 to ADC 3.
Example: if TB2-2 is wired to load cell signal out, **load cell source should be ADC 1**

load cell min: set to 0.

Load cell max: set to

- 15000 lb for load cell PN 325396
- 30000 lb for load cell PN 325057
- 45000 lb for load cell PN 325397
- 60000 lb for load cell PN 325058

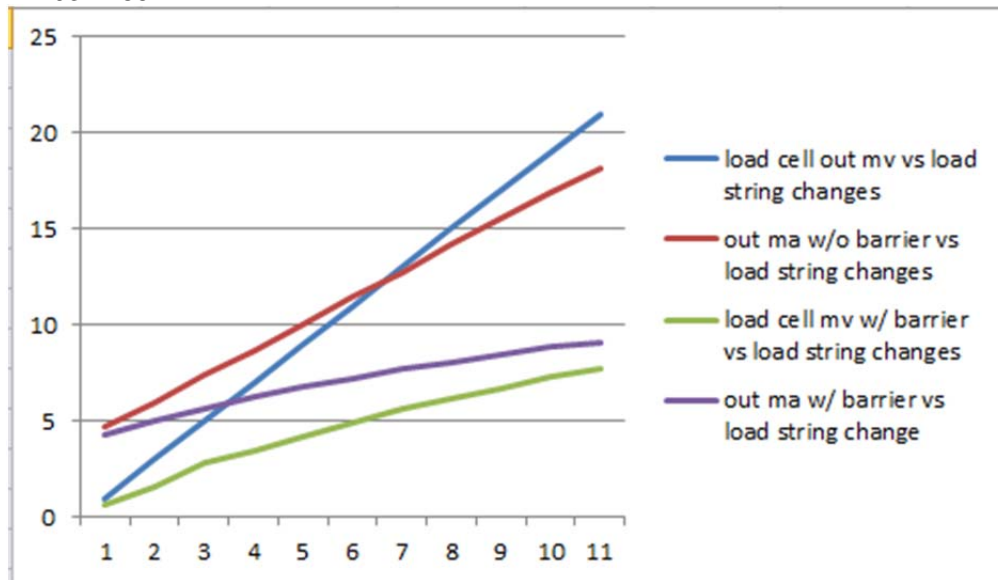
load cell min volts: set to 2 V

load cell max volts: set to 10 V

3.1.4 AW Load Cell Setup with Barrier

The excitation voltage is dropped across the barrier, the gain of ma signal out vs load is reduced a lot. A modified curve must apply.

Currently only 30K AW load cell PN 325056 has the available modified curve with Weidmuler barrier PN 932-186:



load cell min: set to 0.

Load cell max: set to 26000 lb

load cell min volts: set to 2 V

load cell max volts: set to 4.5 V

Notes: it is not recommended to use AW load cell id C1D2 barrier is required. The modified curve is only applied to existing installation. For the order load cell with barrier, always use Flintec load cell.

3.2 Flintec Load Cell Installation and Setup

Flintec Load cell is recommended for all new orders of 30000 lbs.

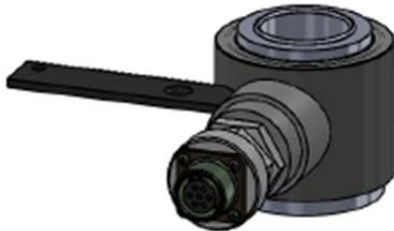
It has 3 wire and 2 wire 4-20 ma output types. PN935935 is referred to 2 wire type only.



3.2.1 Flintec Load Cell Installation direction

Flintec load cell does not have any preferred loading orientation as it is a compression load cell from both sides.

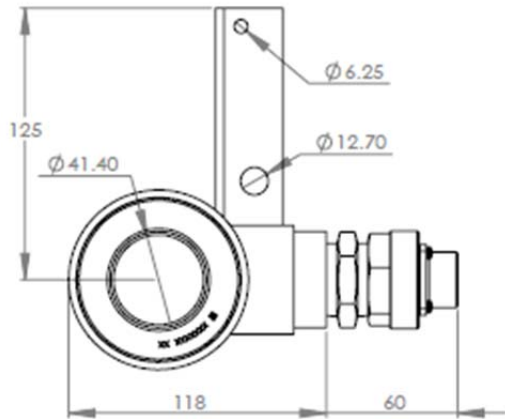
Installation direction either:



Or:



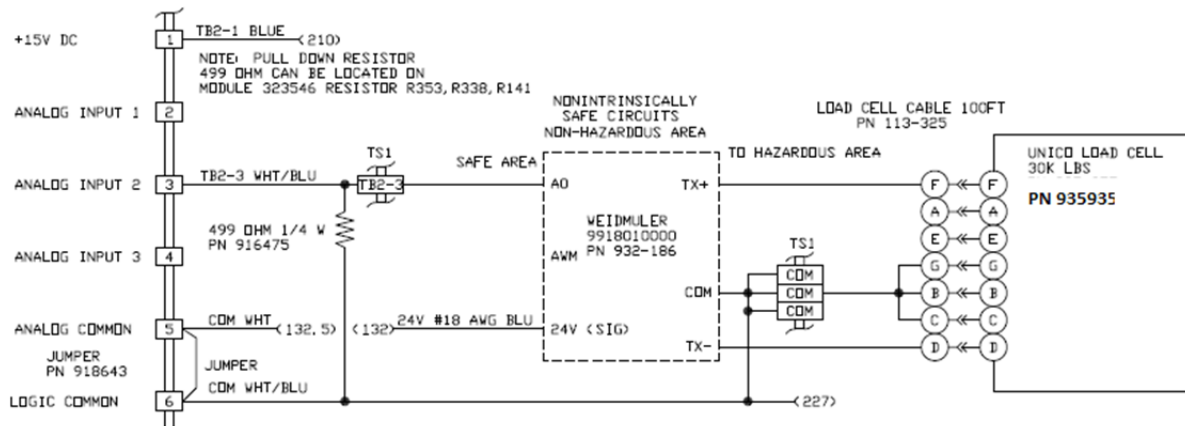
Dimension:



Specification:

Maximum Capacity (E _{max})	klb	30
Metric equivalents (1klb = 0.45359 t)	t	13.6
Temperature effect on zero output (TC0)	%*RO/°C	±0.027 (±0.0015 %*RO/°F)
Temperature effect on sensitivity (TCR0)	%*RO/°C	±0.036 (±0.002 %*RO/°F)
Non-linearity	%*RO	±0.05
Hysteresis	%*RO	±0.05
Repeatability	%*RO	±0.02
Rated Output (RO)	mA	4-20
Zero balance	%*RO	±1
Excitation voltage	V	5...15
Input resistance	Ohm	800 ± 50
Output resistance	Ohm	700 ± 0.5%
Insulation resistance (100VDC)	MOhm	>= 500
Safe load limit	%*E _{max}	200
Compensated temperature range	°C	-25...+65 (-14...+150°F)
Operating temperature range	°C	-55...+88 (-70...+190°F)
Load cell material		SS 17-4PH
Sealing		Complete hermetic sealing
Protection according EN 60529		IP68 (up to 2m water depth) / IP69K

Example of Load cell signal is wired to DSP board TB2 Thru C1D2 barrier:



3.2.3 Flintec Load Cell Setup

Setup of Flintec load cell PN 935935 is the same no matter C1D2 barrier is used or not.

load cell source: set to the ADC that is used for the load cell input

load cell min: **set to 0**

Load cell max: set to **30000 lb**

load cell min volts: **set to 2 V**

load cell max volts: **set to 10 V**

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